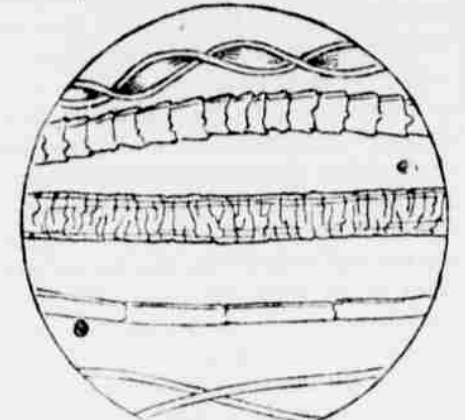


SCIENCE & PROGRESS

Fiber of Textile Fabrics.

In these days of adulteration and deception cotton and linen, cotton and silk, cotton and wool are spun together and woven so adroitly that it is almost impossible to detect the fraud. A sure way is by the microscope.

Cotton is not at all like flax. That has a fiber, and hangs together like a thread when it is pulled. Cotton is called in German "tree wool,"—baumwolle—which it is literally. The fluffy, wool-like substance surrounds the seeds of the plants. It grows in balls or bolls, something like milkweed. If you pull out one of the long, slender hairs of cotton and look at it under a microscope you will see that it is flat, like tape. It is twisted, too.

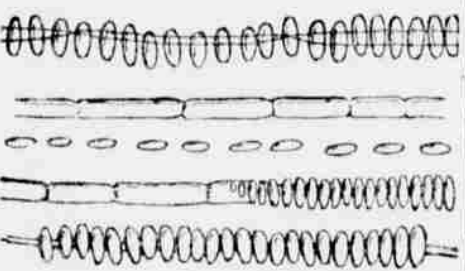


TEXTILE FABRICS.

There are fibers of four different textile fabrics in the picture. They are greatly magnified. Line 1, on top, shows the cotton fiber already mentioned, with its twisted ribbon appearance. Lines 2 and 3, next below, are single hairs of wool. There are two kinds of wool. Line 4 is a fiber of flax, in joints. The last two crossed lines at the bottom show silk fibers, the finest of all. In all these fibers there is an outer roughness and softness which makes it possible for them to be rolled together and make a thread. They will stick together after they are twisted. If an attempt was made to spin a thread of hairs it would fall, for they would not cling together after the pressure was taken off. That is the difference between hair and wool.

The silk worm product has the same rough texture, hence threads can be made of it. But all attempts to spin a thread from the various vegetable skins and silk woods have failed, because their product is a smooth fiber. The single spears would not catch together after twisting.

Dr. Thomas Taylor, of the bureau of microscopy in the United States agricultural department, has been making some very interesting experiments that throw further light on this subject.



FIBERS TREATED WITH ACID.

He takes, for instance, a silk thread that is supposed to be pure cotton. He lets a drop of nitric acid fall upon the thread, and then examines it under the microscope. The silk part will be all shrivelled up and destroyed. The cotton part will remain untouched.

Again, if one takes cotton or flax fibers, drops strong sulphuric acid upon them, immediately followed by drops of the transparent tincture of iodine, they will change to the appearance shown in the second illustration. They will turn a beautiful blue color, and look like beads strung upon a string. The top row in the illustration represents a cotton fiber, those underneath flax.

New Industry.

Three Oaks, Berrien county, Mich., takes pride in the fact that it is the only "feather-bone factory" on earth. What is feather-bone? Briefly, a substitute for whalebone. Mr. E. K. Warren, of Three Oaks, several years ago decided that an excellent bone, equal to whalebone, could be manufactured from quills, and after months of study perfected his idea and patent of his process and machinery. Quills of turkey and goose feathers are used. The first thing is to strip the feathers of their plumage; rollers with knives attached split the quills in halves; the ribs are removed by sand-papered rollers rapidly revolved; then a series of interlocking knives reduce the quills to fiber, and in this state the material is fed to a machine which forms it into a strong, fine cord which is at the same time wound with thread. In another machine four of these cords are wound with thread in such a manner as to form a flat tape; a sewing machine sets a line of stitching between each cord, giving increased strength and elasticity, and it is finished for market by being passed between heavy rollers, which smooth it and give a uniform surface, and packed in boxes containing twelve yard lengths.

Featherbone is also largely unbreakable. Bent double, when straightened, it is as good as ever. It is made in all colors, and in several grades as regards fineness, the "extra fine" being, we should judge, best adapted for use in dressmaking. Casings are not used, as where whalebone is used, the featherbone is simply sewed to the garment. The manufacturers claim it will not warp, and that boiling water does not injure it. Genuine whalebone sells at retail at twenty cents for somewhat less than yard lengths; featherbone for fifteen cents per yard.

A large whip factory is the outgrowth of this unique discovery, and featherbone whips are said to be superior to the best whalebone for awakening and renewing the energies of a lazy horse.—Michigan Farmer.

Moth Proof Wool.

Professor Thomas Taylor, who has been experimenting in this direction, writes: Wool treated in mass in a bath of sulphuric acid, strength sixty degrees B, for several minutes, and afterward quickly washed in a weak solution of soda, and finally in pure water and dried, feels rough to the fingers, owing to the separation of the scales. I have preserved a small quantity of wool thus treated for the last twelve years, my object being to ascertain whether the chemical action to which it was exposed would impair its strength. As far as I can observe, it seems to have retained its original tenacity. Wool thus treated seems to possess the property of resisting the ravages of the larvae of moths. This specimen, although openly exposed for the period named, suffered no injury from them. Under the microscope, the imbrications appear to have resumed their natural position, and appear finer. From these experiments, it would seem not improbable that a new article of commerce might be produced from wool thus treated, considering that it seems to be moth proof.

An Armor Plate that Shot Cannot Pierce. The latest victory in the long drawn battle between the gun and the armor plate has been scored in favor of armor. At Spaulding a German chilled steel armor plate, five feet nine inches in thickness, weighing 100 tons, was fixed against the face of the cliff, and battered with chilled shot from the 100-ton gun. A thunderbolt weighing almost exactly a ton was hurled against the face of the plate by the explosion of 750 pounds of powder without producing more than a slight indentation and some trifling cracks. Three shots failed to make any serious impression on the plate, which has thus come off victor in the struggle. It would seem that no shot yet invented will go through six feet of chilled steel.—Pall Mall Gazette.

Women Hear Better.

It has been found by Dr. Tait that the ear in women can perceive higher notes, that is, sounds with a greater number of vibrations per second, than the ear in men. The highest limit of human hearing is somewhere between 41,000 and 43,000 vibrations per second. Few persons have equal sensibility to acute sounds in both ears, the right ear usually hearing a higher note than the left. The lowest continuous sounds have about sixteen vibrations per second.

Facts of Interest.

Do not eat much meat in hot weather. When a rain cloud is more than 6,000 feet thick, hail is produced. There is now telephonic communication between Philadelphia and Boston.

A Scotchman, Herbert Frang, has invented an electric machine which prints music as it is played.

A spring of magnetic water has been found in Kansas county, Ind. It was struck by some persons boring for coal.

It is thought that a d. n. shot from the new German bomb, charged with dynamite shells, would destroy the strongest fortifications in the world.

Glass plates have been substituted for copper in the shunting of an Italian ship, the advantage claimed being exemption from oxidation and deterioration. The glass was cast, like iron, in plates to fit the hull.

Egyptian engineers have recently discovered the bed of the ancient Lake Moeris. They propose to utilize it as a reservoir for the overflow of the Nile. A canal will be cut from the river to the lake bed. This is the identical thing that Joseph in the Bible is believed to have done, 4,000 years ago.

A lake eight miles square is to be constructed under the Bhore, Ghants, or mountain, which is to supply water to Bombay, British India. An aqueduct will be built to the city. The work will require six years. So ancient Rome was supplied from the Sabine mountains, so Glasgow is supplied from the Highlands to-day.

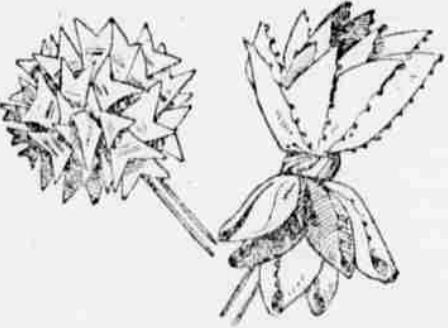
A case of Spencer guns was ordered by Governor Foraker, of Ohio, during the recent apprehension of danger from riot. The Spencer rifle is away beyond the times, these days, although the United States soldiers are provided with it. The Martini-Henry rifle, used by European armies, is the only one up to the requirements of modern times.

Dr. Santaras, a Frenchman, claims to have discovered that by the use of different inhalations, bringing the larynx in contact with air saturated with different vapors, the human voice can be greatly modified. Hoarseness brought on by cold may be cured in a few minutes, and the strength, pitch and character of the voice entirely changed by these inhalations, he declares.

THE FASHIONS

Some Small Fancies.

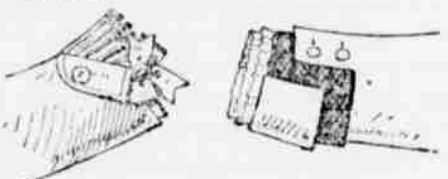
Ribbon bows are everywhere now. Some very pretty ones are made for the hair in various ways, two of which are shown here with.



BOWS FOR THE HAIR.

On the left is a rosette made of ribbons cut in fillet, or points, and secured to hairpins for convenience in arranging the hair. The same style of rosette, made of a trill, flatter, can be used at the belt, and if smaller will be very effective worn at the shoulder when the collar is fastened on one side.

On the right is one of the multi-colored ribbon bows now fashionable for brightening the corsage and wearing in the hair. It is made of feather-edged gros grain ribbon, the colors comprising maroon, pink, chartreuse, lavender, gold and a rus. The ribbon is arranged in pointed loops and ends, which are strapped together with a twisted cross piece in two colors.



SLEEVES.

Here are shown two tasteful ways of finishing off dress sleeves at the wrist. They relieve the severe plainness which has been in fashion so long.

With Tailor Suits.

With the severer tailor suits worn with a masculine collar and cravat young ladies wear a high straw hat this color of the dress, made of rough straw, or else in an open braid that has no lining. The rim turns up closely behind and red also on the left side, while the right side is straight, or in extreme cases is flattened low against the head. The brim is bound with velvet, and a narrow velvet band encircles the crown. A ladder of cross bows of ribbon may extend up the back of the crown, or else it may have long, erect loops with a bunch of long-stemmed blossoms, usually of very small flowers.

For older ladies to wear with tailor suits the newest bonnet-ere of rough, dark straw, made small, yet very high in the crown, so that the extremely high bows of last season may be dispensed with, and instead a rosette of velvet ribbons is used. This large rosette may be all of one color, but is more often of two or three colors, made with all the loops of each color massed together and forming a third of the rosette. Thus, on a black rough straw bonnet there are cream, pale yellow, and black loops in the rosette; for a blue dress, dark blue, dark red and cream white, or else pale blue loops form the rosette; with brown dresses are white, yellow, and brown loops. This trimming is also seen on the black tulle bonnets worn with dressy black suits, and is especially pretty when the fashionable p-tache green is used with pale

lemon yellow and cream white. On a chocolate crown tulle bonnet the rosette may be of pink, cream and chocolate color. The velvet ribbon in these rosettes is only half an inch wide, and is prettiest with curled edges. This forms the entire trimming for the bonnet. The velvet throat bow is of the darkest color in the rosette, and is made of two long loops, or else merely pointed ends that are scarcely an inch wide, yet are long enough to reach back to the ears. Small jeweled pins are thrust in these loops, and are thought to give more style to the to let than if used as brooches; indeed, they are almost the only jewels now worn out-of-doors.

Fabrics for the Seaside.

It is astonishing seeing what an annual affair going to the seaside is, that people do not yet understand how the sea air will prey on knots of ribbon, pretty enough when new, and all the flutings and drappings of a costume that look well in Rotten Row and not at all well by the "lone sea wave." Gingham, zephyrs, holland and dark linen withstand the assaults of wind and wave best; and serge, casemere, nun's cloth, canvas or vicuna in wool; but not chenille, badly dyed stuffs, nor muslin, which loses its stiffness in watering places, you see every day people in flimsy washing gowns and rich brocades utterly unsuitable to the occasion, and falling in the simplicity and cleanliness which should distinguish such dresses. Very big hats are worn, and far too many flowers, by the seaside.

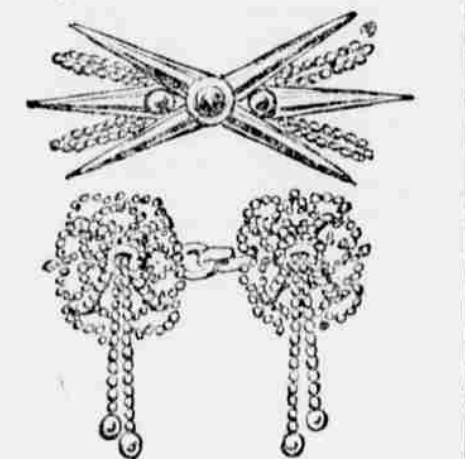
How ignorant, too, women seem to be about dyeing. The aniline dyes, soluble by perspiration, not only dye areas and logs of undesired tints, but bring out eruptions. Violet, red, bright blues and yellows should be washed with care. To be healthy, clothing should only be treated with vegetable dyes. Any dye, as a broad rule, is bad that imparts and stains color to the skin.

Little Girls' Summer Gowns.

Girls from 2 to 5 years wear yoke slips, with sash of the material sewed in the side seams and tied behind. These are of the new open worked laces in stripes, checked gingham and white muslin, and in all cases the yokes and sleeves must be white. Gimpes of white muslin, with low-necked gingham, Chambery, cashmere or lawn dresses, are worn by girls from 4 years upward. Bobel dresses, with a yoke and full round skirt tucked and trimmed, are for girls from 4 to 12, or even for girls in their teens. Two-piece dresses, with a skirt and cutaway jacket, are liked for pique or the dimity fabrics. Low-necked square yokes of velvet are used with India silk, chamois and foulard dresses, but all low-necked dresses have a white muslin gimpes or front piece. V. openings, with cub ciliary let in and the waist laced across, are used on Chambery, pique, cashmere, and white muslin dresses.

Clasps for Wraps and Dresses.

These are still in high favor. They are used on cloaks and scarfs. They fasten skirt drapery, and they are used instead of a brooch. It is necessary to sew them



CLASPS.

firmly in place where they are wanted to remain. Then they stay, and can be hooked and unhooked, as required. They are made of wood, metal, colored glass and other material.

At the top of the illustration is a jet dress clasp, which has the fastening concealed under the disk at the center. Below is a larger clasp of interlaced work in bronze, ornamented with chain pendants.

Little Girls' Hats.

Misses and children's hats are very prettily trimmed. Light-colored straws are lined with fine gauze ruchings and have large tails, too. Quite as much care is bestowed on the "fanciness" of English straws, straws in open work and coarse straws. They also have the under part of the brim lined with ruchings or platings, and often the ends of the hats are covered with seal-shaped lace fastened down here and there under flowers or ribbon rosettes. If the trim of the round hat is raised on one side, a band of ribbon is taken across it and fastened on the crown under a bow or a bunch of flowers. Sometimes there are three or four small bands of faille arranged in this way. They are bordered on one side with tiny ruchings or curls or tails. Many children's hats are covered with flowers.—New York Times.

Trimmings.

Elaborate dresses are trimmed with a lace, embroidered galloon in one color, or with each-mire and Algerian designs, and bands of "brocade" embroidery. These bands will also serve to trim canvas gowns, navy blue jerseys for children's dresses and jerseys and jackets. White brocade jackets are the style for wear and jerseys. They are embroidered with colors such as red, or dotted with tiny gilt stars. Jerseys and jackets are trimmed in the same way with sequins of mother of pearl. Scotch plaid sarah or foulard, combined with plain goods, makes very pretty suits. There are striped foulards and fancy checked materials used for the same purpose. There may be revers and velvet brocades or plaid gimpes on the waists. Foulard and sarah are to be much worn.

FASHIONLETS.

Upper skirts grow fuller. Under skirts remain plain.

Red is at present much used in Paris, particularly for trimmings and linings under transparent tissues.

Pink bonnets or round hats and white parasols are worn as part of bridesmaid's toilet for summer weddings.

Short petticoats are being made of the dearest and most delicate materials and in the most exquisite and artistic designs.

The most fashionable modistes still declare their faith in the comfortable jersey waist, by importing them in almost every color.

Despite their inexpensiveness, rough straw hats remain fashionable year after year, and each season seems to add something to their popularity.

Stamped "satellites" and Albatron cretonnes, looking becoming and serviceable dresses, and they are quite indispensable for country wear.

A caprice of the moment in millinery is that of veiling with tulle various parts of the bonnet or round hat. For instance, the coronet front, instead of being faced with velvet, now has tulle puffed on it, dotted with beads.

BOYS & GIRLS

The Girl Soldiers.

It is one of the best stories you ever read. It was during the war of 1812. That war, you will learn in your history, broke out because American citizens were seized by British sea captains and made to serve as seamen on their ships.

One afternoon in August, 1812, two little sisters, Abigail and Rebecca Bates, sat knitting. They were about 10 and 12 years old, the daughters of the lighthouse keeper at Scituate Beach, Mass., and they sat in the tower of the lighthouse. Above them in the tower was their father, cleaning and trimming his lamps.

The little girls had so many rounds to knit on the wooden stockings before they quit. They were talking of the war. Indeed, there was so much excitement then that the very dogs almost barked at it. British ships' boats put in anywhere and took men out of their gardens and fishing vessels, tied them and rowed off with them, and they and their neighbors could not help it.



COME UP HERE, QUICK!

Along the coast men were stationed to look out for the British ships and give the alarm to the villagers. Scituate had a coast guard, but he was away that afternoon—had gone inland to see his mother, who was very ill. He had left his life and drum in the lighthouse. It was with these that he was to give the alarm to the neighborhood in case a British ship should appear in the harbor.

Hearing these the men thereabout would seize their guns, pistols, knives and clubs, and rush to the rescue if an attempt was made to carry off one of their comrades.

"I wish the coast guard had not gone away," said Abby. "I'm afraid."

"I'm not," said Rebecca. "At that moment their father called them: 'Abigail! Rebecca! Come here quick!'"

They ran like the wind up to the tower. "Look! look, girls! But that a British frigate out in the offing! See the flag flying from her mast! My hand trembles so I can't hold the glass."

In a moment it had been seized the glass and swept the quiet harbor and the open ocean. "Yes! yes! I see it, it is, father and see! they are putting a small boat off to shore; it is loaded with men, and I see the muskets glitter and shine."

"Oh! groaned the keeper, 'what shall we do, and the coast guard gone?'"

"Father," broke in little Abigail, all her fear gone. "Father, I beg and I will take the drum and life, and get behind that point of rocks and play, may be they will think we have some troops here—"

"But, child, how can you get down there without their seeing the drum? They have guns, too!"

"I know," broke in Rebecca, "we'll take the tablecloth and tie it up in that, and they will think it's nothing but a bundle. They won't mind two such little girls as we are."

"God bless you, children, it's a faint hope, but the only one, and you may try it. Don't begin to play till I hang out this white cloth from the window, then you will know they are near the shore."

Away they ran, the brave girls, their hearts beating like the drum itself in their excitement. Their father's heart thumped just the same, for he did not know what might happen to his daughters if the angry British sailors caught them. But it was the last desperate resort, and they must try it.



THE ARMY OF TWO.

The drum is untied, the life is raised to Abby's lips, and so the girls hear the rattle of the oars over the quiet water. Then from the tower flutters the white signal, and on the still air rings the sharp rattle of the drum. The drum notes of the life, it takes the echoes among the rocks and starts the fishermen from their work on the moored fleet, while from the dwellings of the town, in eager alarm, the men in shirt-sleeves and with no hats in their hands come running down to the shore.

And still the martial music rings out clear and shrill, with not a quiver nor a pause, and the boat's crew hear it, too; their oars are suspended in air, a look of rage passes over the faces of the seamen as they see the rallying on shore, and with muttered curses a host of Yankee troops for balking them in their purpose, they turn and row swiftly back to the frigate.

The men from the village have reached the shore, and looking eagerly around for the coast guard, are amazed to see in place of the familiar figure the two daughters of Jared Bates, with white faces, but determined air, still playing the drum sticks and blowing the life.

"Why, girls, it isn't you that's saved us tonight from grief and maybe death!" broke out Capt. Folger, the leader of the company. "God be thanked for your bravery and forethought."

All the rest of their lives, till they grew to old women, the sisters were honored for what they did that day. The story will be told as long as the United States is a republic. When Abby died in March last veterans of the Grand Army of the Republic carried her to her grave, wearing their uniforms.



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